NON-PUBLIC?: N
ACCESSION #: 9107100289
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Shearon Harris Nuclear Power Plant PAGE: 1 OF 05

DOCKET NUMBER: 05000400

TITLE: Reactor Trip During Surveillance Testing and One Reactor Trip Breaker Failed To Open
EVENT DATE: 06/03/91 LER #: 91-010-00 REPORT DATE: 07/03/91

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(i)
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: M. R. Hamby - Project Specialist TELEPHONE: (919) 362-2204
Regulatory Compliance

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED:

ABSTRACT:

The plant received an automatic Reactor Trip on RCS Low Flow during the performance of a maintenance calibration procedure on an RCS flow transmitter. All rods fully inserted on the trip signal. The "A" Reactor Trip Breaker did not open on the automatic reactor trip signal but did open on a subsequent manual trip signal. The failure of the "A" Reactor Trip Breaker to open was due to a failed undervoltage output driver card in the "A" Solid State Protection System. The failure of the undervoltage output driver card was the same as described in IE Notice 85-13 and had apparently occurred during maintenance on May 18, 1991. The failed undervoltage output driver card was replaced with a modified card which prevents this failure mechanism.

This event is being reported as a Technical Specification violation and

Engineered Safety Features actuation per 10CFR50.73 (a)(2)(i)(B) and 10CFR50.73 (a)(2)(iv).

END OF ABSTRACT

EVENT DESCRIPTION:

At 1533, on June 3, 1991, an automatic Reactor Trip occurred due to a pressure spike in the flow transmitter common reference leg for "A" reactor coolant loop low flow. All rods fully inserted on the reactor trip signal. The "A" reactor trip breaker failed to open on the automatic reactor signal but did open on a subsequent manual reactor trip signal. An Auxiliary Feedwater (AFW) actuation signal was initiated on low steam generator water level. All AFW pumps started as required and were later secured.

The low loop flow signal occurred during the performance of surveillance test MST-I0056, Reactor Coolant Flow Instrument (F-0415) Calibration, on one of the three "A" reactor coolant loop flow transmitters. Manipulation of a transmitter isolation valve caused a pressure perturbation in the sensing lines of the two inservice transmitters, resulting in the generation of the low flow signal. MST-I0056 was recently revised because the RCS flow transmitters were changed to a new type during the previous refueling outage. As required for the new type of flow transmitter, steps to correct for instrument zero shift at pressure were added to the procedure. It appears the reactor trip occurred when the high side (common to all three flow transmitters) isolation valve was opened to perform this zero shift check. Procedures have since been revised to use the low side (non-common) isolation valve to perform this zero shift check.

The failure of the "A" reactor trip breaker to open on the automatic reactor trip signal was caused by a failed undervoltage output driver circuit board in the Solid State Protection System (SSPS). The failure of the undervoltage output driver card was initially determined to be a random failure. The undervoltage output driver card was replaced, "A" train SSPS was tested and the plant was restarted. During subsequent investigation it was determined that random failure was probably not the cause of the undervoltage output driver card failure and that it apparently failed during maintenance performed to correct a breaker closing problem on the "A" reactor trip breaker on May 18, 1991. The failure that prevented the "A" reactor trip breaker from opening was the same as described in IEN 85-13 and Westinghouse Technical Bulletin NSID-TB-85-16. This failure mechanism results in the output voltage from

SSPS being maintained even if an automatic trip signal is present. This prevents both the automatic undervoltage and automatic shunt trips. Manual trips remained available during this time period.

CAUSE:

The reactor trip was caused by a perturbation in the sensing lines during isolation valve manipulation while performing MST-I0056, Reactor Coolant Flow Instrument (F-0415) Calibration. This perturbation was caused either by opening the isolation valve too quickly or because the high side (common reference leg) isolation valve was used. Engineer review determined that using the high side isolation valve should be acceptable but that using the low side isolation causes less perturbations and is acceptable for the zero shift check. The failure of "A" Reactor Trip Breaker

CAUSE: (continued)

to open was a result of a failed undervoltage output driver card in the "A" Solid State Protection System. This failure apparently occurred during maintenance on the "A" reactor trip breaker closing circuitry on May 18, 1991. The post-maintenance testing performed after this maintenance verified the close circuit problem was corrected but failed to detect the problem in the SSPS undervoltage output driver card.

There has been one previous event, r
ported in LER 91-009, where
manipulation of instrument valves resulted in an Engineered Safety Features actuation when a common reference leg was affected. In that event, Auxiliary Feedwater actuated on a low steam generator level signal. There have been no previous events that were similar to the "A" Reactor Trip Breaker failure.

SAFETY SIGNIFICANCE:

During this event all systems functioned properly except for the failure of the "A" Reactor Trip Breaker to open. The safety significance of the "A" Reactor Trip Breaker to open on an automatic signal is mitigated by the fact that the "B" Reactor Trip Breaker was always available for automatic actuation and that manual actuation of both Reactor Trip Breakers was always available. Additionally, emergency procedures require that the operator immediately verify all rods fully inserted on a reactor trip signal, if not the operator immediately inserts a manual reactor trip signal. This would have been performed if the "B" Reactor

Trip Breaker had not opened automatically.

The reactor trip and AFW actuation are reported as an Engineered Safety Feature actuation per 10CFR50.73 (a)(2)(iv).

The failure of the "A" Reactor Trip Breaker to open is being reported as a Technical Specification violation per 10CFR50.73 (a) (2) (i) (B).

CORRECTIVE ACTIONS:

1. Revise the Reactor Coolant System flow calibration procedures to perform the zero shift check using the low side (non-common) pressure and include precautions to perform valve manipulation very slowly to prevent perturbations in the sensing lines.

2. Replaced the failed undervoltage output driver card with a new fused card as recommended by Westinghouse Technical Bulletin NSID-TB-85-16.

3. Placed non-fused undervoltage output driver cards on administrative hold and ordered additional fused undervoltage output driver cards.

CORRECTIVE ACTIONS: (continued)

4. The SSPS Logic test will only be deleted as a post-maintenance testing requirement for reactor trip breaker work with the Manager - Operations approval.

5. Additional troubleshooting guidance is being developed and will be incorporated into appropriate procedures.

6. An umbilical cord will be manufactured to supply 125V DC for reactor trip breaker maintenance and troubleshooting. This umbilical cord will not connect to the 48V SSPS output. A temporary 48V power supply will be used to supply a simulated SSPS input signal for any future reactor trip breaker work.

7. Appropriate site personnel involved in maintenance and modification work onsite will be sensitized to this event and the requirement that post-maintenance/post-modification testing be extensive enough to ensure no additional problems are created by the maintenance or modification activities.

Figure "Simplified Circuit Diagram" omitted.

CP&L
Carolina Power & Light Company
P.O. Box 165 o New Hill, N.C. 27562

R. B. RICHEY
Vice President
Harris Nuclear Project

JUL 3 1991

Letter Number: HO-910096 (O)

U.S. Nuclear Regulatory Commission
ATTN: NRC Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 91-010-00

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours

R. B. Richey
Vice President
Harris Nuclear Project

RBR:dmw

Enclosure

cc: Mr. S. D. Ebneter (NRC - RII)

Ms. B. L. Mozafari (NRC - RII)
Mr. J. E. Tedrow (NRC - SHNPP)

MEM/LER91-010/1/OS1

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